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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/891,144	06/25/2001	Robert H. Grubbs	P 0278319 CIT-3219	8866

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Pillsbury Winthrop LLP
Intellectual Property Group
Calendar/Docket Dept.
50 Fremont Street
San Francisco, CA 94105

EXAMINER

ZUCKER, PAUL A

ART UNIT	PAPER NUMBER
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1621

DATE MAILED: 10/02/2003

10

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/891,144

Applicant(s)

GRUBBS ET AL.

Examiner

Paul A. Zucker

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 11 July 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-23 and 25- 42 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 42 is/are allowed.
- 6) ☒ Claim(s) 1, 11-23, 25-34, and 36-41 is/are rejected.
- 7) ☒ Claim(s) 2-10 and 35 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ 6) ☐ Other: _____

DETAILED ACTION

Current Status

1. This action is responsive to Applicants' amendment of 28 June 2002 in Paper No 10.
2. Receipt and entry of Applicants' amendment is acknowledged.
3. Applicant's cancellation of claims 24 and 43-45 is acknowledged.
4. Claims 1-23 and 25- 42 remain pending.
5. The rejections under 35 USC § 112, second paragraph, set forth in paragraphs 1 - 3 of the previous Office Action in Paper No 8 are withdrawn in response to Applicants' amendment.
6. The rejection under 35 USC § 102(b) set forth in paragraph 4 of the previous Office Action in Paper No 8 is withdrawn in response to Applicants' amendment.
7. The rejection under 35 USC § 103 set forth in paragraph 5 of the previous Office Action in Paper No 8 is withdrawn in response to Applicants' amendment.

New Rejections

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

8. Claims 1, 11-23, 25- 34 and 36-41 are rejected under 35 U.S.C. 112, first paragraph, because the specification, while being enabling for cross metathesis using the metal carbene catalysts set forth in claims 2 and 34, does not reasonably provide enablement for cross metathesis in the presence of any arbitrary metal carbene catalyst . The specification does not enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the invention commensurate in scope with these claims. Applicants themselves describe (Specification, page 2, line 20-page 3, line 1) the sensitivity of catalytic systems to substrate structure in their discussion of the work of Crowe and Goldberg.

There are many factors to be considered when determining whether there is sufficient evidence to support a determination that a disclosure does not satisfy the enablement requirement and whether any necessary experimentation is "undue."

These factors include, but are not limited to:

- a. the breadth of the claims: In the instant case the claims are extremely broad encompassing all cross metathesis reactions in the presence of any metal carbene metathesis catalyst;
- b. the nature of the invention: The instantly claimed invention involves the use of catalysts which are generally understood by those of ordinary skill in the art to have a high degree of unpredictability in their behavior.
- c. the state of the prior art: the state of the prior art is generally considered high but would not allow one to predict in advance, based on Applicants' disclosure which of the variety of possible catalysts and reaction conditions could be used

to successfully conduct a cross metathesis reaction in the presence of a catalyst other than the ruthenium catalysts **3a** and **3b** (Specification, page 2, line 11);

e. the amount of direction provided by the inventor: The inventor provide direction for conducting cross-metathesis reactions in the presence of ruthenium catalysts **3a** and **3b** only.

f. the existence of working examples: The only working examples provided are directed to conducting cross-metathesis reactions in the presence of ruthenium catalysts **3a** and **3b**. There is no reason to expect that the use of other, unexemplified, metal carbene catalysts would be successful.

Based upon the analysis above, the Examiner concludes that undue experimentation is required to make and use the claimed invention since the catalytic arts are highly unpredictable and there are an essentially infinite number of possible combinations of substrate structure, catalysts and reaction conditions for which no guidance is provided.

9. Claim 15 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Claim 15 recites the limitation "R¹⁴ is a functional group selected from the group consisting of hydroxyl, thiol,..." in line 4. When R¹⁴ is a hydroxyl or thiol these structures represent the unstable tautomeric forms of aldehydes and thioaldehydes. It is unclear whether claim 15 is intended to include compounds of this type as well. Claim 15 is therefore rendered indefinite.

10. Claim 20 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Claim 15 recites the limitation "R¹³ is a functional group selected from the group consisting of hydroxyl, thiol,..." in line 4. When R¹³ is a hydroxyl or thiol these structures represent the unstable tautomeric forms of aldehydes and thioaldehydes. It is unclear whether claim 20 is intended to include compounds of this type as well. Claim 20 is therefore rendered indefinite.

Claim Rejections - 35 USC § 102

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

11. Claims 26, 33, 34 and 36- 41 are rejected under 35 U.S.C. 102(b) as being anticipated by Crowe et al (Journal of the American Chemical Society, Acrylonitrile Cross-Metathesis: Coaxing Olefin Metathesis Reactivity from a Reluctant Substrate, 1995, 117, pages 5162-5163). Crowe discloses (Page 5163, column 1, top, Table 1) the cross-metathesis reaction of acrylonitrile with a variety of olefins having varying degrees of electron deficiency. Crowe discloses (Page 5162, column 2, lines 5-7) the use of a molybdenum-based carbene metathesis catalyst. Entries 5-7 of Table 1 meet the limitations of instant claims 37-39. Entry 14 meets the limitations of claim 40. Claims 26, 33, 34 and 36- 40 are therefore anticipated by Crowe.

Claim Rejections - 35 USC § 103

12. Claims 1, 11, 16, 25 rejected under 35 U.S.C. 103(a) as being unpatentable over Schwab et al (CA 2249019 04-1999).

Instantly claimed is a method for the formation of a trisubstituted olefin via the intermolecular metathesis reaction between a gem-disubstituted olefin and a terminal olefin in the presence of a metal carbene metathesis catalyst.

Schwab teaches (Page 4, lines 5-10) a process for the metathesis of a mixture of 1-butene, 2-butene and isobutene to produce a mixture of propene, 2-pentene and 2-methyl-2-butene that is then reacted with ethane to give a mixture of 1-butene, isobutene and propene. The appearance of 2-methyl-2-butene in the first step is presumed to result from the intermolecular cross-metathesis reaction of isobutene and propene which meets the instant claim limitations. Schwab exemplifies (Page 15, lines 5-10) the use of $\text{Re}_2\text{O}_7/\text{Al}_2\text{O}_3$ as a catalyst at 60°C . Schwab further teaches (Page 10, lines 23-28) reaction temperatures of 20°C - 80°C .

The difference between the instantly claimed process and that taught by Schwab is that use of a metal carbene metathesis catalyst is instantly claimed while Schwab only exemplifies the use of $\text{Re}_2\text{O}_7/\text{Al}_2\text{O}_3$ as a catalyst.

Scwab, however, specifically suggests (Page 13, lines 26-27) that the metal carbene metathesis catalyst $\text{RuCl}_2(=\text{CHPh})(\text{PCy}_3)_2$ may be used according to his invention.

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One of ordinary skill in the art would thus have been motivated by Schwab's suggestion to modify the exemplified process which produces 2-methyl-2-butene from the intermolecular cross-metathesis reaction of isobutene and propene using $\text{Re}_2\text{O}_7/\text{Al}_2\text{O}_3$ by replacing the catalyst $\text{Re}_2\text{O}_7/\text{Al}_2\text{O}_3$ with the metal carbene metathesis catalyst $\text{RuCl}_2(=\text{CHPh})(\text{PCy}_3)_2$. There would have been a reasonable expectation for success based upon Schwab's teaching of the suitability of $\text{RuCl}_2(=\text{CHPh})(\text{PCy}_3)_2$ for use in the process. Thus the instantly claimed process would have been obvious to one of ordinary skill in the art.

Claim Objections

13. Claims 2-10 and 35 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Allowable Subject Matter

14. Claims 2-10 and 35 are drawn to allowable subject matter. The following is a statement of reasons for the indication of allowable subject matter: The closest prior art of record: Crowe et al (Journal of the American Chemical Society, Acrylonitrile Cross-Metathesis: Coaxing Olefin Metathesis Reactivity from a Reluctant Substrate, 1995, 117, pages 5162-5163) and Schwab et al (CA 2249019 04-1999) neither disclose nor render obvious the instant method of producing trisubstituted olefins employing the catalysts set forth in instant claims 2 and 35.

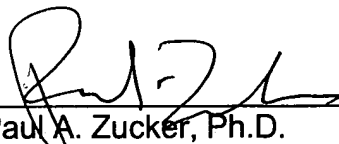
Conclusion

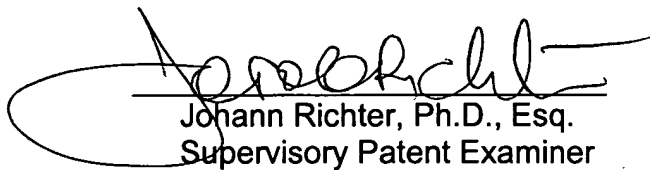
15. Claims 1-23 and 25- 42 remain pending. Claims 1, 11-23, 25-34, and 36-41 are rejected. Claims 2-10 and 35 are objected to. Claim 42 is allowed.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Paul A. Zucker whose telephone number is 703-306-0512. The examiner can normally be reached on Monday-Friday 7:00-3:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Johann R. Richter can be reached on 703-308-4532. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-1235.



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